भारतीय मानक
Indian Standard

IS 8914 : 2022

काँच के तामचीनी उद्योग के लिए जल के लिए गुणवत्ता सहिष्णुता

(दूसरा पुनरीक्षण)

Quality Tolerances for Water for Vitreous Enamel Industry

(Second Revision)

ICS 25.220.50

© BIS 2022

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फ़र मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

November 2022 **Price Group 5**

Water Quality for Industrial Purposes Sectional Committee, CHD 13

FOREWORD

‘This Indian Standard was adopted by the Bureau of Indian Standards on recommendation of the Water Quality for Industrial Purposes Sectional Committee and approval of the Chemical Division Council’.

Water is used in milling of vitreous enamels. Quality of water used in milling operations plays an important role as it helps to form a uniform suspension of the coating medium. If the water used is not of right quality, the impurities which are present in it are likely to coagulate the medium and hence hamper uniform coating. This standard is, accordingly, intended to provide guidelines for vitreous enamel industry in judging the suitability of a particular supply of water so that corrective treatment may be given to achieve the desired results.

This standard was first published in 1978. The first revision of this standard was published in 1988, which prescribed a test for *p*H and modified test for corrosivity. In this second revision the following modifications have been incorporated:

a) Three classes for water used for vitreous enamel industry have been incorporated;
b) Requirements of calcium, magnesium, iron, manganese, sulphates, chloride, hardness, total solids, bicarbonates, and *p*H have been modified based on classification of water used for vitreous enamel industry;
c) References have been updated; and
d) Other editorial changes have also been done to bring the standard in the latest style, and format of Indian Standards.

In the preparation of this standard, considerable assistance has been derived from ASTM: C375- 58 : 2016 ‘Standard classification of water used in milling of porcelain enamel’, published by the American Society for Testing and Materials.

The composition of committee responsible for the formulation of this standard is given at Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’**.**

Indian Standard

QUALITY TOLERANCES FOR WATER FOR VITREOUS ENAMEL INDUSTRY

(Second Revision)

1 SCOPE

This standard prescribes the quality tolerances for water suitable for vitreous enamel industry.

2 REFERENCES

The standards listed below contain provisions which through reference in this text, which constitute provisions of this standard. At the time of publications, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards given below:

IS No.	*Title*
3025 (Part 11) : 1983	Methods of sampling and test (Physical and Chemical) for water and waste water*:* Part 11 *p*H value (*first revision*)
3025 (Part 16) : 1984	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 16 Filterable residue (Total Dissolved Solids) (*first revision*)
3025 (Part 21) : 2009	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 21 Hardness (*second revision*)
3025 (Part 24/Sec 1) : 2022	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 24 Sulphates, Section 1 Gravimetric and Turbidity Methods (*second revision*)
3025 (Part 32) : 1988	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 32 Chloride (*first revision*)
3025 (Part 40) : 1991	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 40 Calcium (*first revision*)
3025 (Part 46) : 1994	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 46 Magnesium (*first revision*)
3025 (Part 51) : 2001	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 51 Carbonate and bicarbonate (*first revision*)
3025 (Part 53) : 2003	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 53 Iron (*first revision*)
3025 (Part 59): 2006	Methods of sampling and test (Physical and Chemical) for water and waste water: Part 59 Manganese (*first revision*)
7022 (Part 1) : 1973	Glossary of term relating to water, sewage and industrial effluents: Part 1
7022 (Part 2) : 1979	Glossary of term relating to water, sewage and industrial effluents: Part 2
17614 (Part 1) : 2021	Water Quality — Sampling: Part 1 Guidance on the design of sampling programmes and sampling techniques
17614 (Part 3) : 2021	Water Quality — Sampling: Part 3 Preservation and handling of water samples

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 7022 (Part 1) and IS 7022 (Part 2) shall apply.

4 CLASSIFICATION

The water used for vitreous enamel industry is classified as following based on the concentration of allowable contaminates and quality requirements of the fired finish:

a) Class A, should not cause any difficulties in the production of a high quality finish;
b) Class B, may be used by slight compensation in processing; and
c) Class C, should be treated before use in order to prevent faulty enamel production.

5 REQUIREMENTS

5.1 Corrosivity

The water shall be non-corrosive when tested as per the method prescribed in Annex A.

5.2 The water shall also comply with the requirements prescribed in Table 1 and Annex A.

6 SAMPLING

6.1 Representative test samples of water shall be drawn as prescribed in IS 17614 (Part 1) and IS 17614 (Part 2).

Table 1 Tolerances for Water for Vitreous Enamel Industry

(*Clause* 5.2)

***Sl* No.**	**Characteristic**	**Requirements**			**Method of Test, Ref to Clause**
		Class A	**Class B**	**Class C**	
(1)	(2)	(3)	(4)	(5)	(6)
i)	*p*H	7.6	7.5	7.3	IS 3025 (Part 11)
ii)	Calcium (as Ca), mg/l, *Max*	31	43	53	IS 3025 (Part 40)
iii)	Magnesium (as Mg), mg/l, *Max*	7.5	10.0	18.0	IS 3025 (Part 46)
iv)	Iron (as Fe) , mg/1, *Max*	0.30	0.62	0.43	IS 3025 (Part 53)
v)	Manganese (as Mn), mg/l, *Max*	0.005	1.05	-	IS 3025 (Part 59)
vi)	Sulphate (as SO_4), mg/l, *Max*	25	102	105	IS 3025 (Part 24/Sec 1)
vii)	Chloride (as Cl), mg/l, *Max*	13	18	18	IS 3025 (Part 32)
viii)	Total hardness (as $CaCO_3$), mg/l, *Max*	38.5	53.0	71.0	IS 3025 (Part 21)
ix)	Total dissolved solids, mg/l, *Max*	147	198	264	IS 3025 (Part 16)
x)	Bicarbonate (as HCO_3) , mg/1, *Max*	117	86	78	IS 3025 (Part 51)

ANNEX A

(*Clause* 5.1 & 5.2)

TEST FOR CORROSIVITY

A-1 GENERAL

A-1.1 Increase in *p*H value after the water has been in contact with calcium carbonate is taken as a sign of corrosivity. According to the tolerance limits (*see* **col 3, 4,** and **5** of **Table 1**) the maximum *p*H value should not exceed 7.6. This means that water should not be alkaline. If the *p*H value of the sample as determined by the procedure given in **A-3.1** is lower than 7.6 but in the acidic range, it will not be advisable to wash the precipitated calcium carbonate thrice with this water as recommended in **A-2.1**. If this is done, loss of carbonate will result due to the evolution of carbon dioxide gas as a result of the action of acidic water on the carbonate. Hence the water to be used for washing the precipitated calcium carbonate should be demineralized water.

A-2 REAGENTS

A-2.1 Precipitated Calcium Carbonate

Place about 10 g of powdered material in a 250 ml glass stoppered bottle. Wash thrice with demineralized water by stirring, allowing to settle for several minutes and then pouring off the supernatant liquid while still turbid.

A-3 PROCEDURE

A-3.1 Take the glass-stoppered bottle containing washed calcium carbonate fill it up with the sample and insert the stopper after allowing all gas bubbles (if evolved) to escape. Shake well to bring the powder in suspension throughout the bottle and open stopper, if necessary, if gas bubbles are formed and re-stopper and then set aside. Repeat shaking at frequent intervals for about 4 h. Finally allow to stand overnight and the filter rapidly by decanting through a filter paper. Determine the *p*H value of the filtrate and report pH value to first decimal place.

Indian Farmers Fertilizer Cooperative Limited, Allahabad	SHRI GORAKH SINGH SHRI K. S. S. MOORTHY (*Alternate*)
Ion Exchange India Limited, Mumbai	SHRI SACHIN SAHA DR RENU SARAPH (*Alternate* I) SHRI ANIL K. KHERA (*Alternate* II)
Maharashtra State Electricity Board, Chandrapur	SHRI V. P. GHODMARE SHRI RAJESH DATTATRAYA CHIVANE (*Alternate*)
Ministry of Drinking Water and Sanitation, New Delhi	SHRI D. RAJASEKHAR SHRI SUMIT PRIYADARSHI (*Alternate*)
Ministry of Urban Development and Poverty Alleviation, New Delhi	DR RAMAKANT MISS CHAITRA DEVOOR (*Alternate*)
National Environment Engineering Research Institute, Nagpur	SHRI G. K. KHADSE DR V. ATUL MALDHURE (*Alternate*)
NTPC Limited, New Delhi	SHRI L. K. NAYAK SHRI ANKIT VERMA (*Alternate*)
Padarsh Pharmaceuticals Private Limited, Mumbai	SHRI MUNEESHCHADDA SHRI MAHON MANOHAR KHANDEKAR (*Alternate*)
Shriram Institute for Industrial Research, Delhi	DR VIVEK NARAYAN SINGH DR JAGDISH KUMAR (*Alternate*)
The Energy and Resource Institute, New Delhi	SHRI ANSHUMAN DR SUNEEL PANDEY (*Alternate*)
The Fertilizer Association of India, New Delhi	SHRI MANISH GOSWAMI SHRI VIJAY KUMAR GUPTA (*Alternate*)
Water and steam Chemistry Division, BARC facilities, Kalpakkam	DR B. ANUPKUMAR DIRECTOR
In personal capacity	SHRI R. S. BAGHEL
In personal capacity	SHRI D. K. JAIN
In personal capacity	DR A. LAWRENCE
BIS Directorate General	SHRI A. K. LAL, SCIENTIST ‘F’ AND HEAD (CHD) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHUBHANJALI UMRAO
SCIENTIST ‘B’ (CHD), BIS

ANNEX B
(*Foreword*)

COMMITTEE COMPOSITION

Water Quality for Industrial Purpose Sectional Committee, CHD 13

Organization	*Representative(s)*
Bhabha Atomic Research Centre, Mumbai	SHRI K. P. BHATTACHARYYA (*Chairperson*)
Bhabha Atomic Research Centre, Mumbai	SHRI SHIVAYYANAMATH S. SHRI T. K. DEY (*Alternate*)
Bharat Heavy Electrical Limited, Thiruchirapali	SHRI SHAILENDRA KUMAR SHRI K. ANANDA BABU (*Alternate*)
Central Ground Water Board, Faridabad	DR NEELAM NIGAM SHRIMATI POOJA MEHROTRA (*Alternate*)
Central Leather Research Institute, Chennai	DR C. MURALIDHARAN DR K. SRI BALA KAMESWARI (*Alternate*)
Central Pollution Control Board, New Delhi	SHRI NAZIMUDDIN SHRI VISHAL GANDHI (*Alternate*)
Central Pulp and Paper Research Institute, Sharanpur	DR NITIN ENDLAY DR SANJAY TYAGI (*Alternate*)
Central Salt and Marine Chemicals Research Institute, Bhavnagar	DR SOUMYA HALDAR DR D. N. SRIVASTAVA (*Alternate*)
Consumer education and Research Centre, Ahmedabad	MISS ANINDITA MEHTA MISS DOLLY JAIN (*Alternate*)
Chennai Petroleum Corporation Limited, Chennai	SHRI S. SHANKAR
CII-Triveni Water Institute	SHRI KAPIL K. NARULA DR SIPIKA CHAUHAN (*Alternate*)
CECRI, Karaikudi	DR S. VASUDEVAN DR R. MALINI (*Alternate*)
Department of Industrial Policy and Promotion, New Delhi	SHRI T. S. G. NARAYANAN SHRI UDAY SINGH MINA (*Alternate*)
Department of Science and Technology, New Delhi	DR NEELIMA ALAM DR SANJAI KUMAR (*Alternate*)
Delhi Jal Board	SHRI ASHUTOSH KAUSHIK
Grasim Industries Limited, Nagda	SHRI S. N. SASTRY SHRI ALOK SINGH (*Alternate*)
Indian Chemical Council	DR MRITUNJAY CHAUBEY SHRI KEDAR OKE (*Alternate*)

This Page has been Intentionally left blank

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.

This Indian Standard has been developed from Doc No.:CHD 13 (19398).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.

Published by BIS, New Delhi